

SNOW SURVEYS IN BIG COTTONWOOD CANYON, UTAH,  
1912 TO 1916.

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During the month of April the annual snow survey of this watershed was made under the direction of S. Q. Cannon, city engineer, by the writer assisted by four men. The equipment consisted of alpen stocks for measuring snow depths and snow density tubes for ascertaining the water equivalent. The survey was made in the period from the 17th to the 23d of April, inclusive.

The party left Salt Lake City Monday afternoon, April 17, and stopped that night at Maxfields Lodge. The next day one party made a survey of Mill D, South Fork, and another party made a survey of Mineral Fork, both parties returning to Maxfields Lodge for the night.

Figures 1 and 2 show the location of the points mentioned in this report.

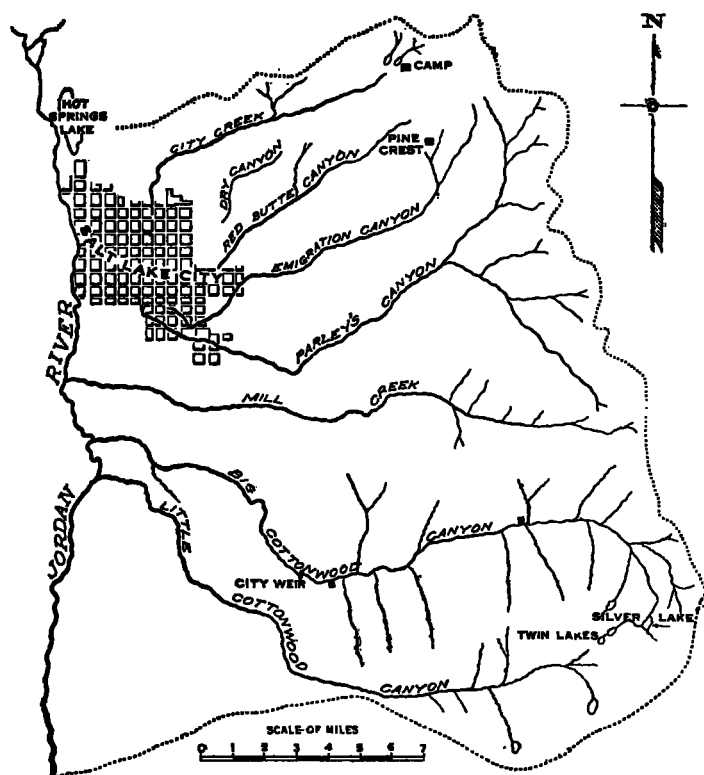


FIG. 1.—Big Cottonwood Canyon and other streams furnishing water to Salt Lake City, Utah.

Wednesday morning the party left the Lodge for Brighton, which is another name for Silver Lake, where it stopped for the remainder of the survey. The trip from the Lodge to Brighton (Silver Lake) was an extremely hard one, as it had snowed practically all night and continued most of the day. About 1 foot of snow fell during the storm. We got our teams only to Mill D, South Fork, and from this point to Brighton (Silver Lake) the trip was made on skis, packing all the supplies and instruments. The new snow made it very hard traveling, the trip from the Lodge to Brighton, about 12 miles, required 12 hours to make. After arriving at Brighton the weather cleared, and the reflection from the snow was intense. From that point surveys were made of all the upper portion of the Big Cottonwood watershed.

Actual measurements were made in Mill D North Fork, Silver Fork, Mill D South Fork, Mill B South Fork, Mineral Fork, Willow Patch, Mill F East Fork, Brighton Basin including the Lake Mary and Twin Lakes areas, and the main canyon from the Forestry Station to Brighton (Silver Lake).

Ninety density measurements and about 300 depth measurements were made.

In the upper part of the watershed where the snow ranged from 8 to 12 feet deep, it was very difficult to make the density measurements, as our tubes were only 74 inches long. The snow had to be dug out with a shovel from 2 to 6 feet in order to get the tube to the bottom, and at depths 4 to 6 feet below the surface of the snow a very hard layer was found, which was almost impossible to penetrate with the tubes. In general the snow was found well packed and drifted. There were numerous snow slides.

The names of the various forks of Big Cottonwood are given on the accompanying figure 2. The areas are named after the forks or creeks, and each one comprises all the area drained by the creek for which it is named.

In Table 1 following are found the names of the areas, with their approximate elevations, the number of the soundings, the average depth of the snow in inches, the water equivalent of the snow, the percentage of density, the acre-feet of water found in each area, and lastly, the area in square miles.

The acre-feet is then computed and the water equivalent averaged for the entire watershed, and these values compared with like values found on surveys for the years 1912 to 1916.

The discharge of the Big Cottonwood is measured at the city weir, and the amount of water passing that weir each season from May 1 to September 30 is compared with the acre-feet of water found on the surveys. The percentage of discharge was often greater than the survey's amount; this was due to the fact that the entire watershed has an area of 48.5 square miles, whereas only 32.41 square miles of the watershed was surveyed. A further discrepancy was caused by the variation in the summer rains.

TABLE 1.—Snow survey of Big Cottonwood Canyon watershed, Salt Lake City, Utah.

Location.	Limiting elevations.	Soundings.		Water equivalent.	Snow Density.	Estimated discharge.	Area of survey.
		Number.	Average depth.				
	<i>Fect.</i>		<i>Inches.</i>		<i>Per cent.</i>	<i>Acre-feet.</i>	<i>Square miles.</i>
Brads Fork.....	6,300-9,600	0	52.73	19.73	37.42	2,209.76	2.10
Mill B, South Fork.....	6,640-9,050	11	52.73	19.73	37.42	2,625.44	2.40
Mineral Fork.....	6,880-8,530	12	40.92	17.36	42.42	1,759.15	1.90
Mill D, South Fork.....	7,075-9,400	10	60.70	22.44	37.97	6,187.46	5.17
Mill D, North Fork.....	7,320-8,600	12	50.25	22.79	45.35	3,075.13	2.53
Days Fork.....	7,470-8,940	0	60.75	25.96	42.73	3,129.05	2.26
Silver Fork.....	7,700-9,500	5	60.80	29.48	48.48	3,333.21	2.12
Willow Patch Fork.....	7,750-8,850	11	58.36	25.01	42.85	1,827.40	1.37
Mill F, East Fork.....	8,150-9,250	6	78.67	33.25	42.27	2,837.33	1.60
Main Canyon and Brighton Basin.....	8,700-9,540	23	79.61	32.37	40.66	11,739.52	6.80
Bear Trap Fork.....	7,550-8,750	0	54.31	23.90	44.01	2,753.28	2.16
North Side Mill B to Mill D.....	6,700-9,000	0	30.60	12.24	40.00	1,305.60	2.00
Total.....		90				42,682.33	32.41
Average.....			56.70	24.69	41.80		
Over total watershed, 1916.....				16.50		42,682.33	48.50
1915.....				9.53		21,662.7	48.50
1914.....				15.34		39,674.2	48.50
1913.....				12.26		31,705.1	48.50
1912.....				21.50		55,561.0	48.50

1 Estimated.

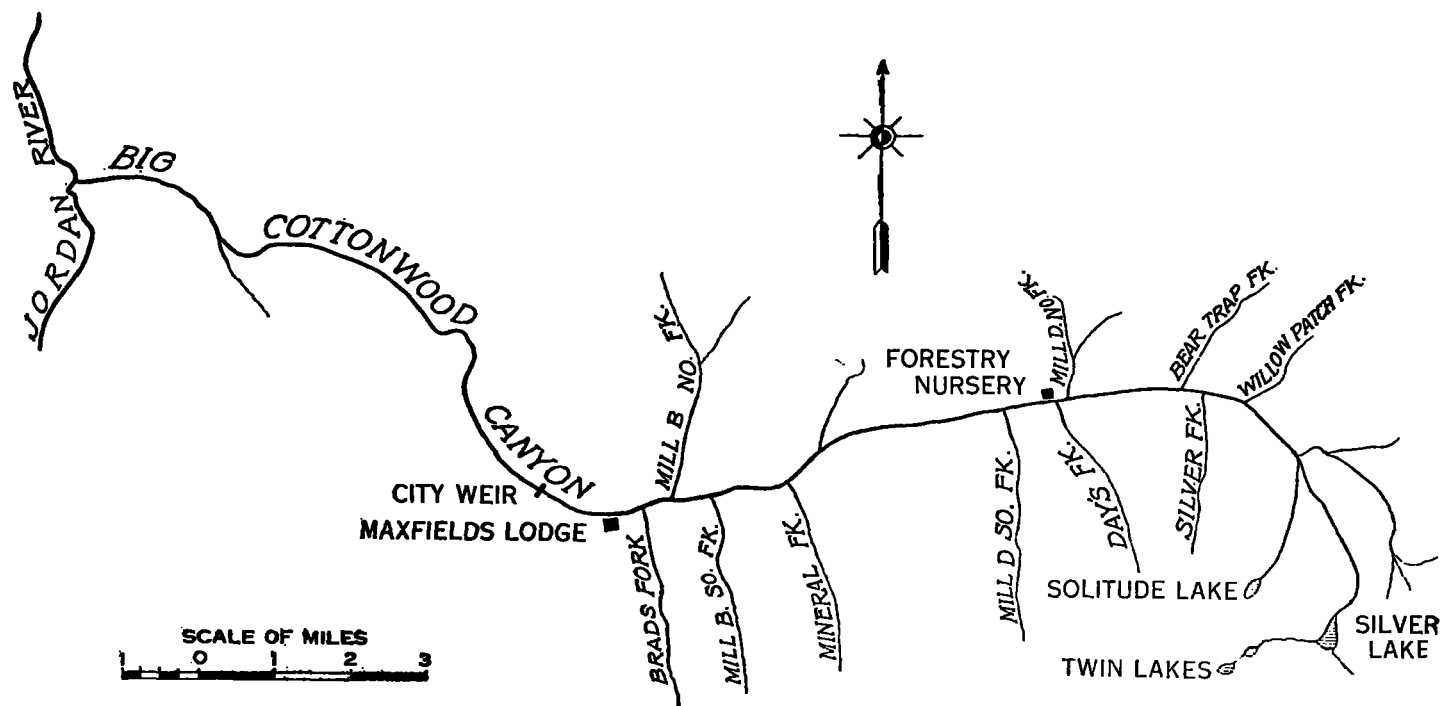


FIG. 2.—Details of Big Cottonwood Canyon, Jordan River, Utah.

TABLE 2.—Actual discharge measured at City Weir on Big Cottonwood Creek compared with discharge estimated from the snow survey May-September.

Year.	Discharge.		Weir Snow sur- vey.
	Weir meas- urement.	Snow sur- vey esti- mates.	
	<i>Acre-feet.</i>	<i>Acre-feet.</i>	<i>Per cent.</i>
1912.....	52,458	55,561	94
1913.....	36,068	31,705	114
1914.....	48,500	39,674	122
1915.....	29,380	24,663	119
1916.....		42,682	

## MEAN LAKE LEVELS DURING JUNE, 1916.

By UNITED STATES LAKE SURVEY.

[Dated: Detroit, Mich., July 5, 1916.]

The following data are reported in the "Notice to Mariners" of the above date:

Data.	Lakes.			
	Superior.	Michigan and Huron.	Erie.	Ontario.
Mean level during June, 1916:				
Above mean sea level at New York.....	<i>Feet.</i> 603.48	<i>Feet.</i> 580.94	<i>Feet.</i> 573.26	<i>Feet.</i> 247.86
Above or below—				
Mean stage of May, 1916.....	+0.48	+0.45	+0.39	+0.73
Mean stage of June, 1915.....	+1.56	+1.15	+1.41	+2.74
Average stage for June, last 10 years..	+1.28	+0.12	+0.41	+0.96
Highest recorded June stage.....	+0.65	-2.69	-1.26	-0.77
Lowest recorded June stage.....	+2.24	+1.04	+1.69	+2.97
Average relation of the June level to:				
May level.....	+0.3	+0.2	+0.1	+0.1
July level.....	-0.2	±0.0	+0.1	+0.1